

## ABSTRACT OF THE DISCLOSURE

The present invention relates to a gas concentration detecting apparatus capable of implementing applied voltage to a gas sensor element with high accuracy to improve the gas concentration detection accuracy over a wide range. 5 The sensor element of the gas concentration detecting apparatus acting as an air-fuel ratio sensor is composed of a gas diffusion rate-determining portion, a solid electrolyte and a pair of electrodes, and an element current corresponding to a specific component concentration flows whenever a voltage is applied to the sensor element. 10 An applied voltage control circuit controls the applied voltage to the sensor element on the basis of an applied voltage characteristic defined linearly. The applied voltage characteristic is set on the basis of a width of a limiting current region at each air-fuel ratio in a wide air-fuel ratio detection range.